

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Group Art Unit: 3677
Examiner: Katherine Mitchell
Inventor: Lutkus, William J.
Serial No. 10/829,101
Filed: April 21, 2004
For: Chromate free
fluoropolymer coated
fastener inserts

**APPLICANT'S APPEAL BRIEF
UNDER 37 C.F.R. § 41.37**

Hon. Commissioner of Patents and Trademarks
Washington, D.C. 20231

Sir:

This is an appeal from the Final Rejection mailed September 13, 2007, for which a Notice of Appeal was filed on November 6, 2007. This brief is timely with a three month extension if it is filed on or before April 6, 2008.

This appeal brief is submitted in triplicate.

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Real Party in Interest

The real party in interest is Newfrey, LLC of Newark, Delaware, to which the inventors have assigned all rights in this invention. The assignment was recorded in the United States Patent and Trademark Office on August 13, 2004, at reel/frame: 015685/0929.

Related Appeals and Interferences

There are no related appeals or interferences.

Status of Claims

Claims 11-21 and 23-27 are pending in the application. Claims 1-10, 22, and 28 are cancelled. Claims 9-20 and 22-30 are rejected. This appeal is taken as to all of the rejected claims.

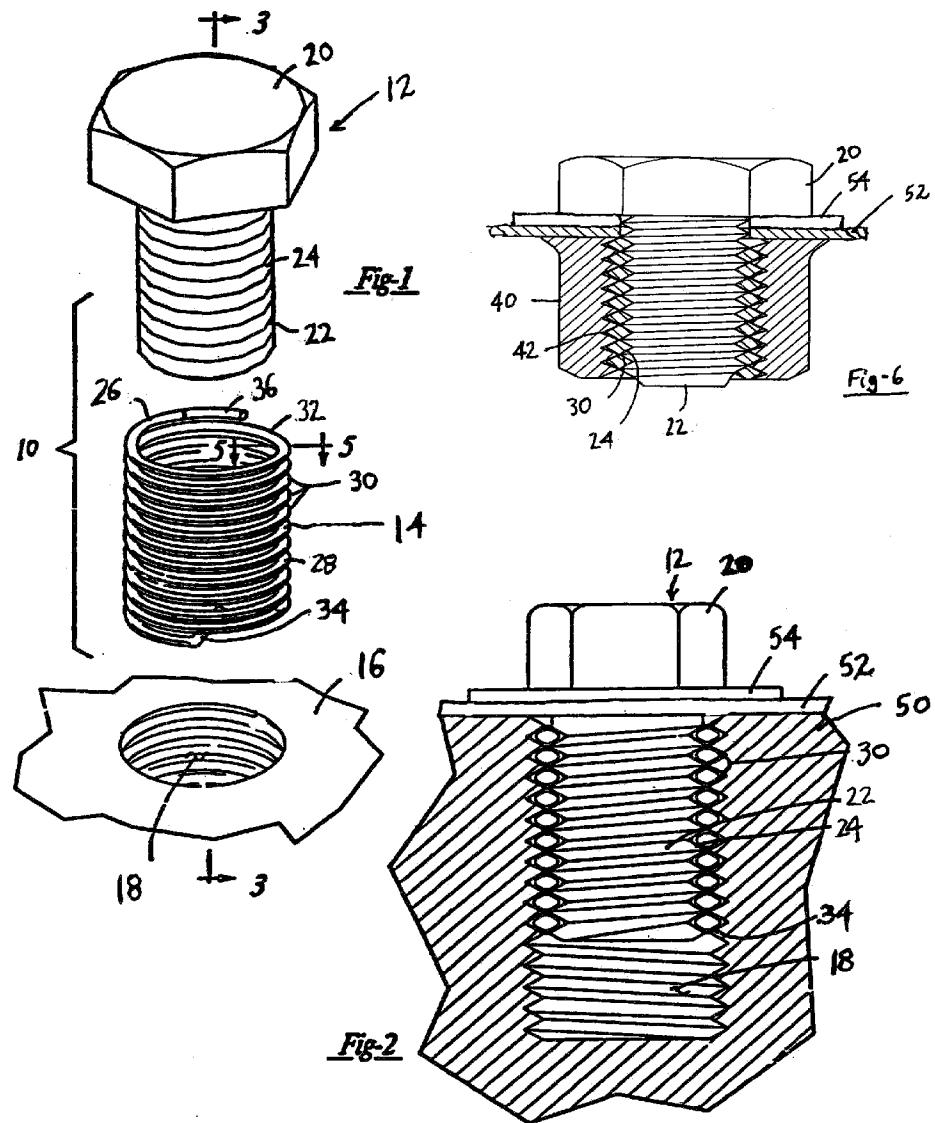
Status of Amendments

There have been no amendments since the final rejection.

Summary of Claimed Subject Matter

The claims recite a coated metallic fastener insert (“insert”) used in a fastener assembly. The insert is coated with a fluoropolymer composition. In an advance, the fluoropolymer composition is free of chromium. The chromium-free inserts perform better in a prevailing torque test than prior art inserts coated with a chromium containing fluoropolymer composition.

An embodiment of a fastener assembly according to the present invention is illustrated in Figures 1 and 2, taken from the current application. Figure 1 is an exploded view of the assembly and Figure 2 is a cross-section of the adjoined assembly.



The fastener assembly **10** includes the insert **14**, a metallic fastener ("fastener") **20**, and a metallic substrate ("substrate") **16** that has a receiving element (shown in Figure 1 and Figure 2 as tapped hole **18**) for receiving the insert. One of the insert, fastener, and substrate is formed of a metal different from the metal of the other components.

The insert, claimed separately in claim 14, is a substantially cylindrical body of helically wound wire that has a bore 5 with a plurality of convolutions 30 for receiving the fastener. The outer surface of the insert is coated with a chromate free fluoropolymer composition. The coating precludes galvanic corrosion with the fastener assembly. Tanged inserts have a tang 34, which is used to facilitate installing the insert into a tapped hole. Once the insert is installed, the tang is broken off with a tool.

In all embodiments, an insert coated with a chromate free fluoropolymer performs better in a prevailing torque test than an insert coated with a prior art chromate containing coating, especially when the torque test is performed on tangless inserts.

The main claims are mapped to the specification and Figures (37 CFR §41.37(c)(v)) as follows:

Claim	Support in Specification and Figures
11. (previously presented) A <u>fastener assembly</u> comprising: a <u>threaded fastener</u> formed from a first metal; a metallic <u>fastener insert</u> ; and a receiving element; wherein at least one of the metallic fastener inserts and the receiving element is formed from second metal;	[0023] Referring to Fig. 1, there is shown a <u>fastener assembly</u> 10 including a <u>threaded fastener</u> 12 and a <u>fastener insert</u> 14 insertable within a tapped hole 18 of a substrate 50. [0007] In view of the foregoing, the present invention relates to a method for preventing galvanic corrosion in fastener assemblies employing a metallic fastener insert and a fastener for use in a <u>receiving element</u> , said method comprising the steps of: a) providing a fastener and a fastener insert for retaining the fastener within said receiving element; b) coating said fastener insert with a <u>chromate free fluoropolymer composition</u> ; and

whereby said fastener insert is coated with a chromate free fluoropolymer composition to reduce the potential occurrence of galvanic corrosion in the fastener assembly, wherein compared with an insert coated with chromate-containing fluoropolymer composition, the insert coated with a chromate-free fluoropolymer composition performs better in a prevailing torque test.

c) adjoining the fastener and coated fastener insert within said receiving element.

[0026] Prior to inserting the fastener insert 14 within the tapped hole 18 or nut barrel 42, if the receiving element 16 is in the form of a locking nut 40, the insert is coated with a chromate free resin bonded fluoropolymer composition such as XYLAN® 5230, available from Whitford Corporation of Westchester, Pennsylvania, by way of non-limiting example.

[0029] Interestingly, the chromate free fluoropolymer coated-fastener inserts of the present invention appear to have a smoother finish than those coated with the chromate inclusive compositions. Despite the smoother finish, the chromate free fluoropolymer coated fastener inserts perform better than fastener inserts coated with chromate inclusive fluoropolymer compositions during prevailing torque test conducted using tangles inserts. This is unexpected in that a smoother finish would normally dictate a propensity for movement of a fastener insert within a tapped hole wherein all operating parameters are the same, which was not the case.

14. (previously presented) A coated metallic fastener insert of a fastener assembly including metallic fastener and a receiving element for said fastener insert, at least one of said insert, fastener and receiving element

[0024] The fastener insert **14** may be of any form capable of retaining the fastener within the receiving element 16 such as a tapped hole 18 of a substrate 50, but preferably is in the form of a helically wound wire 26 including a body 28 having a plurality of convolutions 30 disposed between first and

<p>being formed from a metal alloy which is different from the metal of the other of said insert, fastener or substrate, said insert comprising:</p> <p><u>a substantially cylindrical body of helically wound wire including a plurality of convolutions wherein the outer surface is coated with a chromate free fluoropolymer composition to preclude galvanic corrosion within said fastener assembly, wherein compared with an insert coated with chromate-containing fluoropolymer composition, the insert coated with a chromate-free fluoropolymer composition performs better in a prevailing torque test using tangless inserts.</u></p>	<p>second ends, 32 and 34, respectively. At least one of the ends may be provided with a selectively removable driving tang 36 for assistance in the installation of the insert within a tapped hole.</p> <p>[0029] ... Despite the smoother finish, <u>the chromate free fluoropolymer coated fastener inserts perform better than fastener inserts coated with chromate inclusive fluoropolymer compositions during prevailing torque test conducted using tangleless inserts.</u></p>
<p>23. A <u>fastener assembly</u> comprising:</p> <p> a <u>threaded fastener</u> formed from a first metal;</p> <p> a <u>metallic fastener insert</u>; and</p> <p> a <u>receiving element</u>;</p> <p> wherein at least one of the metallic fastener inserts and the receiving element is formed from second metal;</p>	<p>[0023] Referring to Fig. 1, there is shown a <u>fastener assembly</u> 10 including a <u>threaded fastener</u> 12 and a <u>fastener insert</u> 14 insertable within a tapped hole 18 of a substrate 50.</p> <p>[0026] Prior to inserting the fastener insert 14 within the tapped hole 18 or nut barrel 42, if the receiving element 16 is in the form of a locking nut 40, <u>the insert is coated with a chromate free resin bonded fluoropolymer composition</u> such as XYLAN® 5230, available from Whitford Corporation of Westchester, Pennsylvania, by way of non-limiting example.</p> <p>[0004] While such helically coiled wire inserts are generally useful as anchoring mechanisms for threaded fasteners, in order to be used in high strength applications such inserts must be formed from high strength metals such as 302/304 stainless steel. The use</p>

<p>whereby said fastener insert is coated with a chromate free fluoropolymer composition to <u>reduce the potential occurrence of galvanic corrosion</u> in the fastener assembly.</p>	<p>of stainless steel inserts in fastener assemblies wherein <u>the nut and/or fasteners are formed from other alloys</u> leads to certain perceived problems such as the possibility of <u>galvanic corrosion occurring over time</u>. By the phrase "galvanic corrosion", it is meant the electrochemical corrosion resulting from the current caused in a galvanic cell between two dissimilar metals in an electrolyte because of the difference in potential (emf) of the two metals.</p>
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Grounds of Rejection to be reviewed on Appeal

- I. Claims 11-21 and 23-27 are rejected as obvious over the Lutkus reference (US 6,224,311) in view of the Whitford Paper (Whitford Worldwide's "11 Reasons why Chromium-free Xylan® 5230 is specified by DaimlerChrysler, Ford, and General Motors).

Argument

I. The Examiner has established a *prima facie* case of obviousness of the novel claims on the basis of the Lutkus reference and the Whitford paper

The claimed subject matter represents an improvement of Applicants' earlier work described in the Lutkus reference (US 6,224,311) cited by the Examiner. In the reference, a helical insert is coated with a fluoropolymer composition in order to avoid galvanic corrosion. In the case on Appeal, the claimed improvement is based on the discovery that when the fluoropolymer contains no chromium, the coated inserts and the fastener system have surprising advantages. In particular, the chromium-free inserts perform better in a prevailing torque test than the prior art inserts of the Lutkus reference coated with fluoropolymer.

Claims to the novel subject matter are rejected as obvious over a combination of the Lutkus reference and the Whitford paper. In the Final Rejection on page 3, the Examiner properly lays out the content of the primary reference and its deficiencies:

"Lutkus USP 6224311 teaches a fastener assembly comprising a threaded fastener ... a metallic fastener insert [and] a receiving element However, [the reference] is not specific that the fluoropolymer coating is chromate free."

The Examiner then describes the teaching of the secondary reference and why a person of skill in the art would combine the primary and secondary references:

"Whitford paper teaches the desirability of a chromate free coating to meet the US's "end of Life" Vehicle directive 2000/53/EC, further teaching that DaimlerChrysler, Ford, and General Motors all require such a chromate free coating for their fasteners. ... One would have been motivated to make such a combination

because immediate Market acceptance would have been obtained, as taught/suggested by Whitford paper. Further, compliance with environmental and purchasing standards would be met."

Later, the Examiner states: "the motivation to combine Lutkus and the chromate free coating of the Whitford paper is to comply with production and environmental requirements."

Applicants concede that a *prima facie* case of obviousness of the novel claims is made out on the basis of the cited references.

II. Evidence of unexpected results rebuts the *prima facie* case, but the examiner is considering it only for the propriety of the *prima facie* case.

The record reflects that Applicants' evidence of unexpected results is being improperly analyzed for its ability to prove there is no *prima facie* case of obviousness based on motivation to combine the cited references. Applicants have acknowledged that a *prima facie* case is properly made out, but are offering the declaration evidence in rebuttal. The prosecution of the claims is now discussed with this in mind.

The surprising advantages provided by the novel inserts and fastener assemblies of the claims are described in the specification, and are particularly discussed in view of the inventors' earlier work in the Lutkus reference. At paragraph 0006, Applicants state:

"Recently, ...fastener inserts have been coated with certain resin bonded fluoropolymer compositions. Examples ... are described in U.S. Patent No. 6,224,311 While generally useful, fastener inserts coated with the fluoropolymer compositions described in this document present additional challenges. For example, tangless... inserts coated with fluoropolymer compositions including chromates have been found to move incidentally within a tapped hole during prevailing torque testing."

Later at paragraph 0029, Applicants state:

Interestingly, the chromate free fluoropolymer coated-fastener inserts of the present invention appear to have a smoother finish than those coated with the chromate inclusive compositions. Despite the smoother finish, the chromate free fluoropolymer coated fastener inserts perform better than fastener inserts coated with chromate inclusive fluoropolymer compositions during prevailing torque test conducted using tangless inserts. This is unexpected in that a smoother finish would normally dictate a propensity for movement of a fastener insert within a tapped hole wherein all operating parameters are the same, which was not the case.

The advantage in prevailing torque testing on tangless inserts is recited in rejected independent claims 11 and 14.

During prosecution, Applicants have offered two declarations by inventor William Lutkus, further describing the surprising results and the superiority of the claimed inserts in a prevailing torque test. Throughout, Applicants have requested that the evidence offered in declarations Lutkus I and Lutkus II be considered to rebut the *prima facie* case of obviousness based on the cited references. Applicants are not attacking the sufficiency or propriety of the *prima facie* case.

On August 4, 2006, Applicants offered a first declaration under 37 CFR 1.132 (Lutkus I). Mr. Lutkus described how the unexpectedly better results in the prevailing torque were discovered, and how the improvements, while subtle, were nevertheless significant. At section 12, he states:

“I conclude based on the above data that inserts coated with the chromate free coatings such as claimed in the current application exhibit a surprising improvement over inserts coated with the chromate containing coating. The observed improvement is, if anything, somewhat more noticeable when the test is run on tangless inserts. This observation was completely unexpected. By coating inserts with the chromate free coating of the invention, both tanged and tangless inserts can be produced that comply with the requirements of Standard Industry test methods such as the Heli-Coil® Standard PP-3.” Emphasis added.

Along with the declaration, Applicants stated in the accompanying amendment that

"In order to advance prosecution, Applicants offer the enclosed Declaration under 37 CFR § 1.132 of Mr. William Lutkus, one of the inventors. Applicants respectfully request that the evidence submitted therein of unexpected results be considered in order to overturn the *prima facie* case of obviousness established by combination of the Lutkus reference with the Whitford Paper." Amendment of November 10, 2006, page 13. Emphasis added

In the ensuing Final Rejection, the Examiner stated she "does not see this as convincing proof of unexpected results." Final Rejection February 27, 2007 section 5, page 6. But she continued that:

"Once one is motivated to use chromate free coatings for environmental and marketing reasons, and does so, one would THEN inevitably realize any improved performance in the prevailing torque test, since identical structures perform identically." *Emphasis in original.* Id., section 6, page 7.

Then, in an Advisory Action, the Examiner states, in discussing the contents of the Lutkus I declaration:

Regardless, it does not matter what other benefits are realized with chromate free coatings on the Lutkus fastener of US 6224311, the Whitford paper provides overwhelming motivation to use chromate free coatings on fasteners, ... and any other benefits would be inevitably realized once the chromate free coating was used." Emphasis added

Applicants submit the latter statement was an improper statement of the law, as developed further below.

In response, Applicants offered a second declaration under 37 CFR 1.132 (Lutkus II), reporting the results of new experiments that demonstrated even more clearly the surprising results achieved with the claimed novel inserts and fastener assemblies. In the accompanying amendment of August 28, 2007, on pages 7 and 8, Applicants stated:

"The data presented in the attached Declaration show that there are significant and unexpected differences between inserts

coated with the prior art coatings and those coated with the coatings of the current claims. Such a showing of unexpected results is consistent with Applicants' description of their invention and with the scope of the current claims.

Based on the showing of unexpected results in the attached 2007 Declaration, Applicants respectfully request the *prima facie* case of obviousness be withdrawn." Emphasis added

Applicants reiterate the declaration evidence is being offered to rebut the *prima facie* case.

In the Final Rejection (the subject of this Appeal), the rebuttal evidence of Lutkus I and Lutkus II was not given any weight. Instead, the Examiner appears to totally discount the evidence because it does not overcome the motivation to combine the references, i.e. it does not overcome the *prima facie* case of obviousness. The error is illustrated in the following passages from the Final Rejection of September 13, 2007:

"the fact that there may or may not be unexpected torque-test results is irrelevant." Section 4, page 6, emphasis added

"Examiner agrees that if the only motivation to combine Lutkus and the Whitford paper were the performance of the coated inserts in a prevailing torque test, then the additional tests do indicate that there may be unexpected results in said tests. However, this is not germane in this situation. Examiner maintains that the motivation to combine Lutkus and the Whitford paper has nothing to do with performance in torque tests." Section 5, page 7, emphasis added.

Significantly, the passages in the Final Rejection state that the Lutkus II declaration "may" show unexpected results, but that the declaration is not being considered "in this situation" because the evidence is "irrelevant" and "not germane."

III. As a result, improper weight is given to the evidence of secondary factors, in violation of the obviousness analysis required under *Graham v. John Deere*.

The standard and procedure for determining the obviousness of novel claims is set out in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966). First, the differences between the claims and the prior art are determined and the level of skill in the art is considered. Objective evidence relevant to the question of obviousness must also be considered by Office personnel. *Id.* at 17-18, 148 USPQ at 467. The use of the so-called Graham factors as objective evidence has been recently affirmed in *KSR International Co. v. Teleflex, Inc.* 550 U.S. ___, 82 USPQ2d 1385 (2007).

As adapted to ex parte procedure, Graham is interpreted as placing the burden on the Patent Office to produce a factual basis for its rejection of a claim as obvious. *In re Warner*, 379 F.2d 1011, 1016, 154 USPQ 173, 177 (CCPA 1967) (cited in *In re Piasecki*, 745 F2d 1468, 223 USPQ 785 (Fed. Cir. 1984)). After a *prima facie* case of obviousness has been established, the burden of going forward shifts to the Applicant. Rebuttal is merely 'a showing of facts supporting the opposite conclusion,' and may relate to any of the Graham factors including the so-called secondary considerations. *Id.* at 1471, 223 USPQ at 788, internal citations omitted. Regardless of whether the *prima facie* case would have been characterized as strong or weak, the examiner must consider all of the evidence anew. *Id.*

In apparent violation of the analysis required under *Graham v. John Deere*, and especially of its injunction to consider and weigh all evidence relevant to obviousness,

and in particular to weigh all the rebuttal evidence regardless of the whether the *prima facie* case is considered a strong one, the record reflects that rebuttal evidence that tends to overcome the *prima facie* case was not properly considered. Instead, the record reflects that the evidence of unexpected results presented in Lutkus I and Lutkus II was considered as “irrelevant” and “not germane,” and to “not matter.”

IV. When all the evidence, including the secondary factors discussed in the declaration, is properly considered, the claims are non-obvious.

If rebuttal evidence in the declarations is properly weighed along with the evidence supporting the *prima facie* case, the novel claims are non-obvious in light of the cited art. In the face of the *prima facie* case established by the Examiner, applicant has shown that the results obtained are surprisingly good, and in a way that could not be expected or predicted on the basis of the prior art. Applicants demonstrate that inserts coated with the chromate free coating perform surprisingly well in a prevailing torque test, and that the result is more pronounced on tangless inserts. The inventors were the first to discover these benefits, and are entitled to patentable claims in exchange for disclosing the discovery to the public.

Inventor Lutkus explains in his two declarations that the results are highly significant in his field and lead to important technical advantages. Weighed along with other evidence, the showing of secondary factors is sufficient to rebut the *prima facie* case established by the Examiner.

For these and the other reasons discussed above, Applicant respectfully requests that the rejection of Claims 11-21 and 23-27 be REVERSED.

Respectfully submitted,

Dated: April 1, 2008

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Claims Appendix

LISTING OF CLAIMS

1-10. (cancelled)

11. (previously presented) A fastener assembly comprising:

a threaded fastener formed from a first metal;

a metallic fastener insert; and

a receiving element;

wherein at least one of the metallic fastener inserts and the receiving element is formed from second metal;

whereby said fastener insert is coated with a chromate free fluoropolymer composition to reduce the potential occurrence of galvanic corrosion in the fastener assembly, wherein compared with an insert coated with chromate-containing fluoropolymer composition, the insert coated with a chromate-free fluoropolymer composition performs better in a prevailing torque test.

12. (original) The fastener assembly of Claim 11, wherein said coating has an average dry thickness of between about 0.3 to 0.5 mils.

13. (original) The fastener assembly insert of Claim 11, wherein said coating has an average viscosity at the time of application of between about 20 to 30 seconds at 25°C.

14. (previously presented) A coated metallic fastener insert of a fastener assembly including metallic fastener and a receiving element for said fastener insert, at least one of said insert, fastener and receiving element being formed from a metal alloy which is different from the metal of the other of said insert, fastener or substrate, said insert comprising:

a substantially cylindrical body of helically wound wire including a plurality of convolutions wherein the outer surface is coated with a chromate free fluoropolymer composition to preclude galvanic corrosion within said fastener assembly, wherein compared with an insert coated with chromate-containing fluoropolymer composition, the insert coated with a chromate-free fluoropolymer composition performs better in a prevailing torque test using tangless inserts.

15. (original) The coated metallic fastener insert of claim 14, wherein said insert is formed from stainless steel.

16. (original) The coated metallic insert of claim 14, wherein said insert reduces galling of said fastener.

17. (original) The coated metallic fastener insert of claim 14, further comprising a primer applied to said insert prior to the application of said fluoropolymer composition.

18. (original) The coated metallic fastener insert of claim 14, wherein said coils of said insert provide 60° internal screw threads upon insertion within said tapped hole.

19. (previously presented) The coated metallic fastener insert of claim 14, wherein the insert is tangless.

20. (previously presented) The fastener assembly of claim 11, wherein the insert is tangless.

21. (new) The fastener assembly of claim 11, wherein the receiving element is a tapped hole.

22. (cancelled)

23. (previously presented) A fastener assembly comprising:
a threaded fastener formed from a first metal;
a metallic fastener insert; and
a receiving element;
wherein at least one of the metallic fastener inserts and the receiving element is formed from second metal;
whereby said fastener insert is coated with a chromate free fluoropolymer composition to reduce the potential occurrence of galvanic corrosion in the fastener assembly.

24. (previously presented) The fastener assembly of claim 23, wherein said coating has an average dry thickness of between about 0.3 to 0.5 mils.

25. (previously presented) The fastener assembly insert of claim 23, wherein said coating has an average viscosity at the time of application of between about 20 to 30 seconds at 25°C.

26. (previously presented) The fastener assembly of claim 23, wherein the insert is tangless.

27 (previously presented) The fastener assembly of claim 23, wherein the receiving element is a tapped hole.

28. (cancelled)

Evidence Appendix

There is no evidence submitted pursuant to 37 C.F.R. §§ 1.130, 1.131, or 1.132.

Related Proceedings Appendix

There have been no related appeals and interferences and therefore no related decisions exist.